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010 U.S. PTO 09760
JC760 U.S. PTO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
REQUEST FOR FILING APPLICATION UNDER RULE 53(b)

Pursuant to 37 CFR 1.53(b), please file a   Ref.: EX-2DC4
☒ continuation/ ☐ divisional
of the pending prior PATENT APPLICATION of:
Inventor: Michael J. SHEA   Date: April 3, 2000
Serial No. 09/317,980   Group: 3764
Filed: May 25, 1999   Examiner: TBA
For: **EXERCISE APPARATUS**

JC571 U.S. PTO
09/541986
04/03/00

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

This request for filing under Rule 53(b) is made by the following named inventor(s) (using the above-identified title):

Inventor(s): Michael J. SHEA

☒ Attached is a true copy of the prior application as originally filed including the specification, claims, Oath/Declaration
 and drawings (if any) and abstract (if any). No amendments (if any) referenced in the Oath or Declaration filed to
 complete the prior application introduced new matter.
☐ Priority is hereby claimed under 35 USC 119 based on the following foreign applications:

Application Number	**Country**	**Day/Month/Year/Filed**

☐ certified copy(ies) of foreign application(s) attached or
☐ already filed on _____ in prior appln. no. _____ filed _____
☐ already filed in _____ F i l e d _____
☐ Please amend the specification by inserting before the first line: -- This application claims the benefit of U.S.
 Provisional Application No. ____ , filed ____ .--
☐ The prior application is assigned to ____ .
☐ Power of Attorney has been granted to ____ , Reg. No. ____ of ____ .
☒ Address all future communications to: Michael J. Shea, 1726 Creek Crossing Road, Vienna, Virginia 22182.
☐ Please amend the specification by inserting before the first line --This is a ____ of application Serial No. ____ , filed
 ____ .--
☒ "Small entity" statement of record. ☐ "Small entity" statement attached.
☐ Petition filed in prior application to extend its life to insure copendency.
☒ The Examiner's attention is directed to the prior art cited in the parent application by applicant and/or Examiner.
☒ Please enter the attached and/or below preliminary amendment **prior** to calculation of filing fee:

☐ The entire disclosure of the prior application above-referenced is considered as being part of the disclosure of this new
 application and is hereby incorporated by reference therein.

FILING FEE IS BASED ON CLAIMS AS FILED LESS ANY HEREWITH CANCELED

Basic Filing Fee...						$	690.00
Total effective claims	5	- 20 (at least 20) =	0	x $ 18.00		$	0.00
Independent claims	1	- 3 (at least 3) =	0	x $ 78.00		$	0.00
If any proper multiple dependent claims now added for first time, add $260.00 (ignore improper).............................						$	0.00
					SUBTOTAL	$	**690.00**
If "small entity," then enter half (1/2) of subtotal and subtract..						-$(	345.00)
					SECOND SUBTOTAL	$	**345.00**
Assignment Recording Fee ($40.00)						$	0.00
					TOTAL FEE ENCLOSED	$	**345.00**

1726 Creek Crossing Road
Vienna, Virginia 22182   By: Michael J. Shea, Reg. No. 34,725

MJS:mjs   Signature: *Michael J Shea*

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 C.F.R. §§1.9(f) AND 1.27(b)) — INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. §1.9(c) for purposes of paying reduced fees under §§41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled __EXERCISE APPARATUS__

described in   ■   the specification filed herewith.

     ☐   application serial no. _____ filed _____

     ☐   patent no. _____ filed _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 C.F.R. §1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 C.F.R. §1.9(d) or a nonprofit organization under 37 C.F.R. §1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

     ■   no such person, concern or organization.

     ☐   persons, concerns or organizations listed below.*

     NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 C.F.R. §1.27)

FULL NAME _____   ☐   Individual

ADDRESS _____   ☐   Small Business Concern

_____   ☐   Nonprofit Organization

FULL NAME _____   ☐   Individual

ADDRESS _____   ☐   Small Business Concern

_____   ☐   Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR §1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that false statements and the like so made are punishable by fine, imprisonment, or both a fine and imprisonment under Section 1001 of Title 18 of the United States Code; and further that false statements made willfully may jeopardize the validity of the application, of any patent issuing thereon, or any patent to which this verified statement is directed.

Michael J. SHEA _____   _____   _____
Name of Inventor   Name of Inventor   Name of Inventor

[signature: Michael J Shea]

_____   _____   _____
Signature of Inventor   Signature of Inventor   Signature of Inventor

June 22, 1995 _____   _____   _____
Date   Date   Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Michael J. SHEA   Ref.: EX-2DC4

Serial No. **TBA**   Group: TBA

Filed: **April 3, 2000**   Examiner: TBA

For: **EXERCISE APPARATUS**

* * * * * * * * * * *

April 3, 2000

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Prior to examination, please amend the above-identified patent application
as follows:

IN THE SPECIFICATION

On page 1, before (numbered) line 4, insert

--This application is a continuation of Application No. 09/317,980, filed

May 25, 1999, which is a continuation of Application No. 08/869,166, filed June

4, 1997, now abandoned, which is a divisional of Application No. 08/493,541,

filed June 22, 1995, now abandoned.--

On page 11, line 20, change "204" to --120--.

IN THE CLAIMS

Please cancel claims 1-19, without prejudice or disclaimer.

Please add the following new claims 20-24:

--20. A method, comprising:

a remote computer transmitting advertisements to each of a plurality of exercise apparatuses, each exercise apparatus comprising an exercise device and a display; and

each exercise apparatus displaying the advertisements transmitted thereto on its display while exercisers exercise using its exercise device.

21.   The method according to claim 20, wherein the plurality of exercise apparatuses include one or more stationary bicycles.

22.   The method according to claim 20, wherein the plurality of exercise apparatuses include one or more stair climbers.

23.   The method according to claim 20, further comprising:

each exercise apparatus displaying exercise data on its display while the exercisers exercise using its exercise device.

24.   The method according to claim 20, further comprising:

arranging the plurality of exercise apparatuses in a health club.--

REMARKS

This application is a continuation of Application No. 09/317,980, filed May 25, 1999, which is a continuation of Application No. 08/869,166, filed June 4, 1997, now abandoned, which is a divisional of Application No. 08/493,541, filed June 22, 1995, now abandoned.

Entry of the above amendment and prompt examination are respectfully requested.

Respectfully submitted,

By: _Michael J. Shea_

Michael J. Shea
Reg. No. 34,725

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1726 Creek Crossing Road
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EXERCISE APPARATUS

BACKGROUND OF THE INVENTION

1.   Technical Field

The present invention generally relates to an exercise apparatus and, more particularly, to an exercise apparatus which transmits data to and receives data from a remote location.

2.   Description of Related Art

Many exercisers currently utilize one or more exercise devices in their training routines. These exercise devices include, for example, weight machines, stair climbers, rowing machines, treadmills, and stationary bicycles. Some of these devices are controllable by microcomputers in accordance with exerciser-selected programs which set and/or vary the exercise level during program execution. Figures 1 and 2 illustrate a stationary bicycle 5 which provides automatically-varying exercise levels as disclosed in U.S. Patent No. 4,358,105 to Sweeney, Jr. The control system for the stationary bicycle includes a microcomputer 10 which communicates electronically with a keyboard 12, a read-only memory 14, and a display 16. The read-only memory 14 stores the operating

program for microcomputer 10 and a plurality of pre-stored exercise programs which are selectable by an exerciser. Movement of pedals 20 rotates a sprocket 22, which causes a chain 24 to drive a small diameter sprocket 26 attached to a flywheel 28. The variable load which an exerciser must overcome in order to rotate sprocket 22 is generated by an alternator 30, which provides a variable resistance to the effort of the exerciser through its driving connection with flywheel 28 by a gear belt 32. Microcomputer 10 controls the loading circuit of alternator 30. The output of microcomputer 10 on line 34 is a pulse width modulated signal, the width of which is proportional to the effort required by the exerciser. The changes in pulse width vary the field current in the alternator to cause variations in the resistance of the alternator to the force exerted by the operator. An exerciser using the stationary bicycle may select a pre-stored exercise program from read-only memory 14 for execution by microcomputer 10 to automatically vary the exercise difficulty level by generating pulses whose width is a function of the effort required by the exerciser. Using keyboard 12, an exerciser is also able to select a difficulty level and an exercise time.

From workout to workout, an exerciser will often select different exercise programs and set different difficulty levels and/or exercise times in order, for example, to achieve particular fitness goals and/or to avoid injury. Thus, for example, an exerciser may select an exercise program, difficulty level, and exercise time which define a relatively easy workout on a day following a hard workout. In addition, after several months of a training routine, an exerciser will likely find that he or she is able to use an exercise device at higher difficulty levels and/or for longer exercise times. Thus, an exerciser will likely find that he or she

is capable of pedaling a stationary bicycle in accordance with selected exercise programs for a longer exercise time at a higher difficulty level than at the beginning of the training routine. Similarly, an exerciser using a weight machine will likely find that he or she will be able to perform more repetitions using more weight (or resistance) after several months of a training program.

However, the memories of exercise apparatus of the type described above are typically programmed by the manufacturer and cannot be changed by dealers or consumers. Thus, such exercise apparatus generally provide only a limited number of exercise programs from which an exerciser may select. While a manufacturer could provide a greater number of pre-stored exercise programs, this would require an increase in the size of read-only memory 14, thereby increasing costs. And even if a larger memory were provided for storing more programs, the memory contents would still not be changeable by dealers and/or consumers and the manufacturer would still not be ensured that the exercise programs satisfy the requirements of all exercisers, particularly exercisers having specific exercise needs or goals. The fixed memory contents may also lead to boredom on the part of the exerciser who must repeatedly choose an exercise program from the same selection of exercise programs. This boredom may cause the exerciser to reduce, or even stop, using the exercise apparatus.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, an exercise apparatus includes an exercise device, a memory including a first memory portion, and a receiver for receiving exercise programs transmitted over a first communication link. A control unit supplies received exercise programs to the

first memory portion for storage in the first memory portion as first exercise programs and selectively controls the exercise device in accordance with the first exercise programs.

In accordance with another aspect of the present invention, a method of operating an exercise apparatus including an exercise device and a memory with a first memory portion includes the steps of receiving exercise programs transmitted over a first communication link, supplying received exercise programs to the first memory portion for storage in the first memory portion as first exercise programs, and selectively controlling the exercise device in accordance with the first exercise programs.

In accordance with another aspect of the present invention, a central office for an exercise system includes generating circuitry for generating an exercise program for controlling an exercise device and a transmitter for transmitting the exercise program over a communication link.

In accordance with yet another aspect of the present invention, a method of providing exercise programs for controlling an exercise device includes the steps of generating an exercise program for controlling an exercise device and transmitting the exercise program over a communication link.

In accordance with yet another aspect of the present invention, an exercise system includes a central office having generating circuitry for generating an exercise program for controlling an exercise device and a transmitter for transmitting the exercise program over a communication link. The exercise system further includes at least one exercise apparatus including an exercise device, a memory including a first memory portion, and a receiver for receiving exercise

programs transmitted over the communication link. The exercise apparatus further includes a control unit for supplying the received exercise programs to the first memory portion for storage in the first memory portion as first exercise programs and for selectively controlling the exercise device in accordance with the first exercise programs.

In accordance with another aspect of the present invention, a method of operating an exercise device including a memory having a first memory portion includes the steps of generating an exercise program for controlling an exercise device, transmitting the exercise program over a communication link, receiving exercise programs transmitted over the communication link, supplying received exercise programs to the first memory portion for storage in the first memory portion as first exercise programs, and selectively controlling the exercise device in accordance with the first exercise programs.

Thus, in accordance with the present invention, the memory of an exercise apparatus may be downloaded with exercise programs from a remote location. As new exercise programs are developed for exercise apparatus, these programs may be easily supplied to apparatus already "in the field." In addition, exercise apparatus may be provided with the capability of uploading data to a central office to permit monitoring of the use of an exercise apparatus and of the selection of exercise programs. The present invention provides the further ability to transmitting text data including messages, news headlines, sports scores, stock market prices, weather reports, advertisements, and the like for display at the exercise apparatus to provide a mental activity during exercise.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side elevational view of a prior art stationary bicycle 5.

Figure 2 is a schematic showing the electronic control system of stationary bicycle 5 of Figure 1.

Figure 3 is a block diagram of an exercise system in accordance with the present invention.

Figure 4 is diagram illustrating the arrangement of memory 120 of Figure 3.

Figure 5 is a side elevational view of a stationary bicycle 200 which may be utilized in the exercise system of the present invention.

Figure 6 is a schematic showing the electronic control system of stationary bicycle 200 of Figure 5.

Figure 7 is a graphical profile of exercise level versus time for an exercise program which may be utilized by microcomputer 202 of Figure 6 to automatically control the exercise level of stationary bicycle 200.

Figure 8 is a table depicting an organization of exercise programs stored on portable memory module 103.

Figure 9 illustrates display 208 and keypad 210 shown in Figure 5.

DETAILED DESCRIPTION

Figure 3 is a block diagram of an exercise system 100 in accordance with the present invention. Exercise system 100 includes a central office 102 and one or more exercise apparatus 104-1 to 104-n which are remotely located with respect to central office 102. For example, exercise apparatus 104-1 to 104-n may be located in homes of exercisers and central office 102 may be located at a health

club office, a personal trainer's office, or a physician's office. Alternatively, exercise apparatus 104-1 to 104-n may be located in a health club and central office 102 may be located in an office of the health club. Of course, the exercise apparatus and the central office may be otherwise located and the present invention is not limited in this respect. Data is communicated between central office 102 and exercise apparatus 104-1 to 104-n over a communication link 106. For example, data including software such as exercise programs, and text data such as news headlines, sports scores, stock market prices, weather reports, messages, advertisements, and the like may be transmitted from central office 102 to exercise apparatus 104-1 to 104-n over communication link 106. Also, data may be transmitted from the respective exercise apparatus to central office 102 over communication link 106. This data may, for example, be data indicating the number of times the respective exercise apparatus has been used or data indicating which exercise programs have been selected. The above examples of data which is communicated between central office 102 and exercise apparatus 104-1 to 104-n are provided for illustrative purposes only and other types of data may be communicated within the spirit and scope of the present invention. Communication link 106 may, for example, be an infrared link, a radio frequency (RF) link, a coaxial cable, a telephone network, a satellite system, or an optical fiber. Although the embodiment of Figure 3 shows only a single communication link, it will be apparent that a first communication link may be provided for data transmissions from central office 102 to exercise apparatus 104 and a second, different communication link may be provided for data transmissions from the exercise apparatus 104 to central office 102. In addition, data may be transmitted

to the exercise apparatus from a first central office and data may be transmitted from the exercise apparatus to a second, different central office.

A processor 110 controls the overall operation of central office 102. A transmitter 112 transmits data over communication link 106 to the exercise apparatus 104-1 to 104-n. A receiver 114 receives data transmitted over communication link 106 from the exercise apparatus. A display device 116 such as a monitor displays information to a system operator and an input device 118 such as a keyboard permits the system operator to input information. Other output devices (not shown) such as a printer, speakers, etc. and other input devices (not shown) such as a mouse may also be provided. A memory 120 which may include both read only memory (ROM) and a non-volatile random access memory (NVRAM) stores an overall operating program for central office 102 as well as data to be described below with reference to Figure 4. One or more external data sources 122 remotely located relative to central office 102 transmit data to central office 102 over a communication link 107. The data from the external data sources may then be forwarded to the exercise apparatus 104-1 to 104-n over communication link 106. For example, these external data sources may transmit exercise programs and/or text data such as news headlines, sports scores, stock market prices, weather reports, advertisements, etc. to central office 102. Processor 110 then supplies this data to memory 120 for storage and reads the data out at a later time for transmission by transmitter 112 to exercise apparatus 104-1 to 104-n. Central office 102 may also transmit data to the external data sources over communication link 107. Like communication link 106, communication link

107 may, for example, be an infrared link, an RF link, a coaxial cable, a telephone network, a satellite system, or an optical fiber.

Exercise apparatus 104-1 includes a receiver 152 for receiving data transmitted by central office 102 over communications link 106 and a transmitter 154 for transmitting data to central office 102 over communications link 106. A processor 156 controls the overall operation of the exercise apparatus. The exercise apparatus also includes an exercise device 158 which may be, for example, a stationary bicycle, stair climber, treadmill, rowing machine, or weight machine. A display 160 displays information to an exerciser. A memory 162 which may include a read-only memory and a non-volatile memory stores data for the operation of exercise apparatus 104-1. Data such as exercise programs and text items which is received by receiver 152 is supplied to memory 162 by processor 156. An input device 163 such as a keypad receives input from an exerciser. A port 164 may optionally be provided to connect the exercise apparatus to an external device such as a television or speakers. Exercise apparatus 104-2 to 104-n may be similarly configured.

With reference to Figure 4, memory 120 of central office 102 includes a first memory portion 130 for storing an operating program for central office 102, a second memory portion 132 for storing exercise programs, a third memory portion 134 for storing system information, and a fourth memory portion 136 for storing text data. Memory 120 may be, for example, a magnetic disk drive, a battery backed-up non-volatile random access memory (NVRAM), or a PCMCIA EEPROM memory card. The information in the memory portions may be

generated by the system operator or supplied from one or more of external data sources 122.

Second memory portion 132 stores at least one exercise program which is executable by one or more of the exercise apparatus 104. It will be appreciated that second memory portion 132 may store a variety of exercise programs suitable for use by different types and models of exercise apparatus. For example, one exercise program may be executable by a stationary bicycle of a first manufacturer to vary exercise level as a function of time while another exercise program may be executable by a stair climber of a second manufacturer to vary exercise level as a function of time. Accordingly each exercise program will preferably have associated therewith identification data for identifying the type and model of exercise apparatus for which the program is suitable. The exercise programs may be developed by the system operator or may be transmitted from one or more of the external data sources.

Third memory portion 134 stores system information. For example, each of the exercise apparatus 104-1 to 104-n may have associated therewith a unique apparatus identifier or address for identifying the exercise apparatus. The system information stored in third memory portion 134 may thus be organized in accordance with these apparatus identifiers. Third memory portion 134 may also store additional information regarding each exercise apparatus, for example, identification information identifying the type and model of exercise apparatus (stationary bicycle, stair climber, etc.) and program information listing the exercise programs currently stored in memory 162 of the exercise apparatus. Third memory portion 134 may also store the name, address, and telephone number of

the owner of the exercise apparatus. Alternatively or in addition, third memory portion may store a name, address, and telephone number associated with the location of the exercise apparatus. If the exercise apparatus is linked to the central office over a telephone network, third memory portion 134 may also store the telephone number for establishing a telephone communication link between the central office and the exercise apparatus. Typically, the above-described data would be entered by the system operator, although the present invention is not limited in this respect.

Fourth memory portion 136 stores text data such as messages, news headlines, sports scores, stock market prices, weather reports, advertisements, and the like. This text data may be generated by the system operator and/or may be transmitted to central office 102 from one or more of external data sources 122.

The above-described functions of central office 102 may be implemented by a computer such as an IBM®-compatible personal computer. The personal computer may include appropriate software for generating exercise programs which are executable by a microcomputer of the exercise apparatus 104-1 to 104-n and which, for example, specify the exercise level as a function of time. A program title, description, etc. may then be associated with each program as will be discussed below. The programs and associated information may then be stored on a hard-disk drive which serves as memory 204. The personal computer may be equipped with a modem and appropriate communications software for transmitting and receiving data including the above-described exercise programs and text data over a telephone line which serves as communication link 106. The

modem and communications software may also be utilized to transmit and receive data from the external data sources 122 over communication link 107.

Figures 5 and 6 illustrate a stationary bicycle 200 which may utilized as one of exercise apparatus 104 in accordance with the exercise system of the present invention. Elements of stationary bicycle 200 which are the same as those of stationary bicycle 5 shown in Figures 1 and 2 are designated with the same reference numbers and descriptions thereof are omitted. Although reference is made to a stationary bicycle, the teachings of the present invention are applicable to exercise systems which include any exercise apparatus having an exercise device controllable by a microcomputer in accordance with a program, including by way of example, but not by way of limitation, stationary bicycles, stair climbers, rowing machines, treadmills, and weight machines.

The control system of stationary bicycle 200 includes a microcomputer 202 for controlling the operation of stationary bicycle 200, a read-only memory (ROM) 204, a non-volatile random access memory (NVRAM) 206 (e.g., a battery backed-up random access memory), a display 208, a keypad 210, a speaker 212, a transmitter 214, and a receiver 216. An optional output port 218 may be provided to connect the exercise apparatus to one or more output devices 220 such a television or speakers.

ROM 204 stores an operating program of microcomputer 202 and may also contain various pre-stored exerciser-selectable programs for controlling stationary bicycle 200. Microcomputer 202 generates control signals supplied over line 34 for controlling the exercise level of stationary bicycle 200 in accordance with an exercise program selected either from ROM 204 or NVRAM 206. Display 208

includes, for example, light emitting diodes (LEDs) and/or liquid crystal displays (LCDs) and is responsive to signals from microcomputer 202 for displaying various information to the exerciser including, but not limited to, the exercise time, the exercise level, number of calories burned, and the like as is known in the art. Keypad 210 includes exerciser-operable keys for inputting various data as will be discussed below. Speaker 212 is responsive to microcomputer 202 for providing audible sounds to the exerciser to indicate, for example, the end of an exercise program or an incorrect selection or entry via keypad 210. Transmitter 214 transmits data to central office 102 over communication link 106 and receiver 216 receives data transmitted from central office 102 over communication link 106. If communication link 106 is a telephone network, for example, transmitter 214 and receiver 216 may be implemented by a modem which is coupled to a telephone line.

An exercise program is executable by microcomputer 202 for automatically controlling stationary bicycle 200. Figure 7 is a graphical profile of exercise level versus time for an illustrative, but non-limiting, exercise program which may be utilized by microcomputer 202 to automatically control the exercise level of stationary bicycle 200. As illustrated in the profile of Figure 7, from exercise time t_0 until exercise time t_7, microcomputer 202 generates control signals for setting the exercise level of stationary bicycle 200 to exercise level E1; from exercise time t_7 until exercise time t_{19}, microcomputer 202 generates control signals for setting the exercise level of stationary bicycle 200 to exercise level E2; from exercise time t_{19} until exercise time t_{26}, microcomputer 202 generates control signals for setting the exercise level of stationary bicycle 200 to exercise level E3;

from exercise time t_{26} until exercise time t_{38}, microcomputer 202 generates control signals for setting the exercise level of stationary bicycle 200 to exercise level E2; and from exercise time t_{38} until exercise time t_{48} (the end of the program), microcomputer 202 generates control signals for setting the exercise level of stationary bicycle 200 to exercise level E1. When a program having the profile of Figure 7 is selected, an exerciser may select an exercise time over which microcomputer 202 will control stationary bicycle 200. The selection of an exercise time determines the time interval between the exercise times. For example, when an exercise program having the profile of Figure 7 is selected, an exerciser may choose an exercise time of four, eight, twelve, sixteen, or twenty minutes. Depending on which total exercise time is selected, the time interval between the exercise times is five, ten, fifteen, twenty, or twenty-five seconds, respectively. An exerciser may also select a difficulty level which determines the difficulty of the exercise at the exercise levels of the program. The difficulty of exercise levels E1, E2, and E3 is generally less at low difficulty levels than at high difficulty levels. Thus, as the fitness level of an exerciser increases, higher difficulty levels may be utilized.

Of course, the exercise program of Figure 7 is for illustrative purposes, and the present invention is not limited in this respect. Thus, an exercise program may also be of a type which provides interactivity via a visual display such as a television screen. For example, the execution of such a program may cause microcomputer 202 to monitor the activity level of the exerciser (e.g., how fast the exerciser is pedaling) via the SENSOR line shown in Figure 6 and to output data to an output device 218 such as a television to thereby simulate a competition

between the exerciser and a computer-generated opponent or opponents. For example, an exercise program for a stationary bicycle may generate a bicycle race between the exerciser and a computer-generated opponent. The "ability" of the opponent and the duration of the race may be set in accordance with the fitness level of the exerciser.

Figure 8 is a table depicting an organization of exercise programs stored in NVRAM 206. Exercise program 1 is stored at memory location 1, defined for example, by a memory address. If desired, a program name and description may be associated with exercise program 1. Exercise programs 2, 3,..., n are stored at memory locations 2, 3, ..., n as indicated. The operating program of microcomputer 202 stored in ROM 204 is configured to permit microcomputer 202 to access these exercise programs and to permit an exerciser to select an exercise program which is stored in memory 206. Of course, the exercise programs may be organized in various ways in memory 206 and the invention is not limited in this respect. In addition, as noted above, one or more exercise programs may be stored in a portion of ROM 204, if desired, using a memory organization similar to that illustrated in Figure 8. If exercise programs are stored in a portion of ROM 204, the operating program is configured to permit an exerciser to select an exercise program which is stored in either ROM 204 or memory 206.

Figure 9 illustrates display 208 and keypad 210 arranged on a display and keypad panel. Display 208 includes various display portions 301-306. During program selection, display portion 301, exercise time indicator 311, and difficulty level indicator 312 prompt an exerciser to enter an exercise time and difficulty level for an exercise program. During exercise, display portion 301 displays an

elapsed exercise time while display portion 302 alternately displays the current difficulty level of the exercise program and the number of calories burned. Exercise time indicator 311, difficulty level indicator 312, a calories burned indicator 313 are LEDs, for example, which are appropriately illuminated to indicate which quantity should be entered by the exerciser during program selection and/or which quantity is being displayed during the exercise time. Exercise level display portion 303 displays a graphical profile of exercise level versus time for the exercise program such as is shown, for example, in Figure 7. Display portion 304 is a line display including one or more lines 380 which may display graphical and text information such as program names and descriptions, operating instructions, and text data items to an exerciser. Display portion 305 provides a display relating to how fast an exerciser should be pedaling stationary bicycle 200 at a current exercise level and display portion 306 provides a display of how fast an exerciser is actually pedaling. Displays of other information may also be provided, if desired. It will be appreciated that the displays of stationary bicycles and other exercise apparatus may be varied in accordance with the information which it is desired to display and the present invention is not limited in this respect. Keypad 325 includes a numeric keyboard portion 330 having numeric keys 0-9; a START key 332; an ENTER key 334; a NEXT key 336; a PREV (previous) key 338; and a CLEAR/STOP key 340.

The transmitting of exercise programs and text data from central office 102 to exercise apparatus 104-1 to 104-n will now be described. The system operator may select one or more exercise programs from second memory portion 132 and/or text data from fourth memory portion 136 for transmission to one of

exercise apparatus or to a group of exercise apparatus. For example, the system operator may transmit exercise programs and text data to a group of exercise apparatus which are of the same type and model. Processor 110 supplies the selected exercise programs and/or text data from memory 120 to transmitter 112 for transmission to the exercise apparatus. For example, if communication link 106 is a telephone network and transmitter 112 is a modem, processor 110 utilizes appropriate communication software to transmit the data the next time a telephone link is established between central office 102 and the exercise apparatus. This may occur either when the central office dials an appropriate telephone number to connect the central office to the exercise apparatus or when the exercise apparatus dials a telephone number of the central office to connect the exercise apparatus to the central office. When a connection is established, the data is downloaded from the central office to the exercise apparatus. At the time of this connection, data may also be uploaded from the exercise apparatus to the central office. The telephone connections may established automatically at specified times as controlled by processor 110 or microcomputer 202 or may be initiated by the system operator. The exerciser may prompt an exercise apparatus to establish a telephone connection with the central office by pressing a button (not shown) provided on keypad 210. Of course, the telephone link described above is for illustrative purposes only and other techniques may be utilized for the purpose of establishing a communication link between the central office and the exercise apparatus. For example, data may be broadcast to the exercise apparatus via an in-band or out-of-band data channel of a conventional cable television system. Data may be addressed to particular exercise apparatus in the same manner that

data is addressed to particular subscriber terminals. Specifically, the exercise apparatus may be connected to an exercise apparatus data port of a subscriber terminal in a cable television system. A processor or application specific integrated circuit (ASIC) of the subscriber terminal supplies the exercise program and text data to the exercise apparatus data port and this data is then output to the receiver of the exercise apparatus. The processor of the exercise apparatus supplies the data received by the receiver to memory 162 of the exercise apparatus. For example, with respect to the stationary bicycle of Figures 5 and 5 and 6, exercise programs received by receiver 216 may be supplied to a first memory portion of NVRAM 206 and text data received by receiver 216 may be supplied to a second memory portion of NVRAM 206.

To select an exercise program, an exerciser actuates START key 332. Microcomputer 202 prompts the exerciser to select an exercise program. Exercise programs are selectable from among the programs stored in NVRAM 206 and, if provided, from any programs stored in ROM 204. The exerciser may be prompted to select an exercise program by, for example, displaying the program name and description on line display portion 304 and additionally or alternatively displaying a corresponding graphical profile of the exercise level versus time on display portion 303. The exerciser is able to step forward and backward through the available exercise programs using NEXT key 336 and PREV key 338. For example, using the NEXT key 336 and PREV key 338, an exerciser may cause microcomputer 202 to step forward and backward through the programs in ROM 204 and/or NVRAM 206. To select an exercise program whose program name, program description, and/or profile is displayed, the exerciser actuates ENTER

key 334. If appropriate for the selected exercise program, the exerciser is prompted to enter an exercise time and difficulty level. When these values have been appropriately entered, microcomputer 202 controls stationary bicycle 200 in accordance with the exercise program, exercise time, and difficulty level. Microcomputer 202 may also update a third memory portion of NVRAM 206 to indicate a use of the exercise apparatus and to indicate which exercise program was selected. During execution of the program, microcomputer 202 controls display 208 to display data such as the elapsed exercise time to the exerciser, current difficulty level, RPM-GOAL, RPM-ACTUAL, and the like. Display portion 303 may be appropriately illuminated to indicate an exerciser's progress through the exercise profile. At the end of the exercise program, microcomputer 202 drives speaker 212 to output an audible sound indicating the end of the program. Program execution may be stopped prior to the end of the program by pressing CLEAR/STOP key 340.

An almost limitless number of exercise programs may be developed in which the exercise level of the exercise device is varied over time or in which a simulated competition is generated. By providing an arrangement in which exercise programs may be downloaded into the exercise apparatus, the on-board memory of the exercise apparatus may be provided with a wide variety of new exercise programs from which an exerciser may select.

In addition to downloading exercise programs, central office 102 may also download text data including news headlines, sports scores, stock market prices, weather reports, advertisements, and the like. In addition, a system operator may generate a text message which may be sent to particular exercise apparatus. The

text message may, for example, describe new exercise programs or exercise equipment which is or will be available. This text data may be displayed to the exerciser on line display 304 while the exerciser is exercising in order to provide a mental activity for the exerciser. Microcomputer 202 may cause line display 304 to display each text data item for a predetermined period of time or up and down arrow keys (not shown) may be provided to permit the exerciser to step through the text data items. These text items may be periodically downloaded to exercise apparatus 104, for example, every 24 hours, when one or more exercise programs are downloaded, or when data is uploaded to the central office. Of course, the text items are not limited to news headlines, sports scores, stock market prices, weather reports, and advertisements.

As noted above, although the above description is based on a stationary bicycle, the present invention is generally applicable to any exercise apparatus controllable in accordance with a program. Such apparatus are manufactured, for example, by Life Fitness, Nautilus, Schwinn, and the like. Thus, for example, for a treadmill, control signals may control the speed of the tread and/or the inclination of the tread to the horizontal. For a stair climber, the control signals may control the resistance of the pedals. For a weight machine, the control signals may control the resistance.

Each of the above-referenced patent documents is hereby incorporated by reference into the instant specification.

While there has been shown and described the preferred embodiments of the invention, it will be evident to those skilled in the art that various

modifications may be made thereto without departing from the spirit and scope of the invention which is set forth in the appended claims.

I CLAIM:

1. An exercise apparatus, comprising:

an exercise device;

a memory including a first memory portion;

a receiver for receiving exercise programs transmitted over a first communication link; and

a control unit for supplying received exercise programs to said first memory portion for storage in said first memory portion as first exercise programs and for selectively controlling said exercise device in accordance with the first exercise programs.

2. The exercise apparatus according to claim 1, wherein said memory further includes a second memory portion for storing pre-stored second exercise programs and said control unit further selectively controls said exercise device in accordance with the second exercise programs.

3. The exercise apparatus according to claim 2, further comprising:

selecting means for selecting the first and second exercise programs.

4. The exercise apparatus according to claim 3, wherein said memory further includes a third memory portion for storing data related to selected first and second exercise programs.

5. The exercise apparatus according to claim 4, further comprising:

a transmitter, wherein said control unit supplies the data stored in said third memory portion to said transmitter and said transmitter transmits the data supplied thereto over a second communication link.

6. The exercise apparatus according to claim 5, wherein said receiver and said transmitter comprise a modem.

7. The exercise apparatus according to claim 5, wherein the second communication link is a telephone network.

8. The exercise apparatus according to claim 5, wherein the second communication link is a radio frequency communication link.

9. The exercise apparatus according to claim 5, wherein the second communication link is a satellite communication link.

10. The exercise apparatus according to claim 5, wherein the first and second communication links are different communication links.

11. The exercise apparatus according to claim 1, wherein said memory further includes a second memory portion for storing text items.

12. The exercise apparatus according to claim 11, further comprising:
a display for displaying said text items.

13. The exercise apparatus according to claim 1, wherein said control unit outputs data to an external device during control of said exercise device in accordance with at least one of the first exercise programs.

14. A method of operating an exercise apparatus including an exercise device having a memory with a first memory portion, the method comprising the steps of:

receiving exercise programs transmitted over a first communication link;

supplying received exercise programs to said first memory portion for storage in said first memory portion as first exercise programs; and

selectively controlling said exercise device in accordance with the first exercise programs.

15.   A central office for an exercise system, comprising:

generating means for generating an exercise program for controlling an exercise device; and

a transmitter for transmitting the exercise program over a communication link.

16.   The central office according to claim 15, further comprising:

a receiver for receiving data transmitted over the communication link.

17.   A method of providing exercise programs for controlling an exercise device, the method comprising the steps of:

generating an exercise program for controlling an exercise device; and

transmitting the exercise program over a communication link.

18.   An exercise system, comprising:

a central office, including:

generating means for generating an exercise program for controlling an exercise device; and

a transmitter for transmitting the exercise program over a communication link; and

at least one exercise apparatus, said at least one exercise apparatus including:

an exercise device;

a memory including a first memory portion;

a receiver for receiving exercise programs transmitted over said communication link; and

a control unit for supplying the received exercise programs to said first memory portion for storage in said first memory portion as first exercise programs and for selectively controlling said exercise device in accordance with the first exercise programs.

19. A method of operating an exercise device including a memory having a first memory portion, the method comprising the steps of:

generating an exercise program for controlling an exercise device;

transmitting the exercise program over a communication link;

receiving exercise programs transmitted over said communication link;

supplying received exercise programs to said first memory portion for storage in said first memory portion as first exercise programs; and

selectively controlling said exercise device in accordance with the first exercise programs.

EXERCISE APPARATUS

ABSTRACT OF THE DISCLOSURE

An exercise apparatus includes an exercise device, a memory including a first memory portion, and a receiver for receiving exercise programs transmitted over a first communication link. A control unit supplies received exercise programs to the first memory portion for storage in the first memory portion as first exercise programs and selectively controls the exercise device in accordance with the first exercise programs.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Michael J. SHEA   Dckt. No. EX-2DC4

Serial No. **TBA**   Group: TBA

Filed: **April 3, 2000**   Examiner: TBA

For: **EXERCISE APPARATUS**

*   *   *   *   *   *   *   *   *   *   *

April 3, 2000

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

<u>SUBMISSION OF FORMAL DRAWINGS</u>

Enclosed are nine (9) sheets of formal drawings (Figures 1-9) for the above-

identified patent application.

Respectfully submitted,

By: _Michael J. Shea_

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FIG. 1
PRIOR ART

FIG. 2
PRIOR ART

FIG. 3

OPERATING PROGRAM — 130

EXERCISE PROGRAMS — 132

SYSTEM INFORMATION — 134

TEXT DATA — 136

120
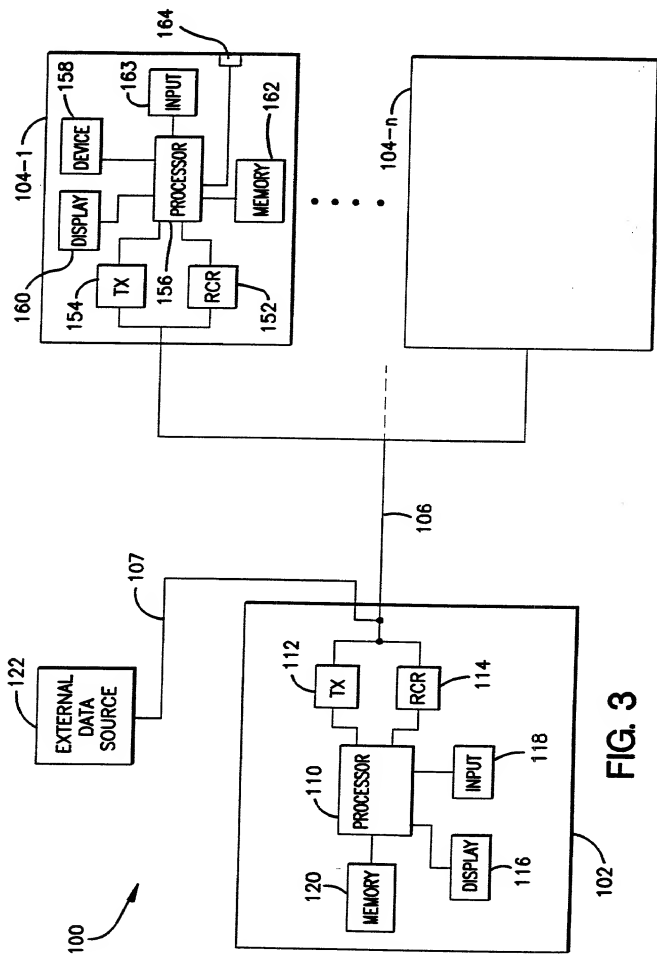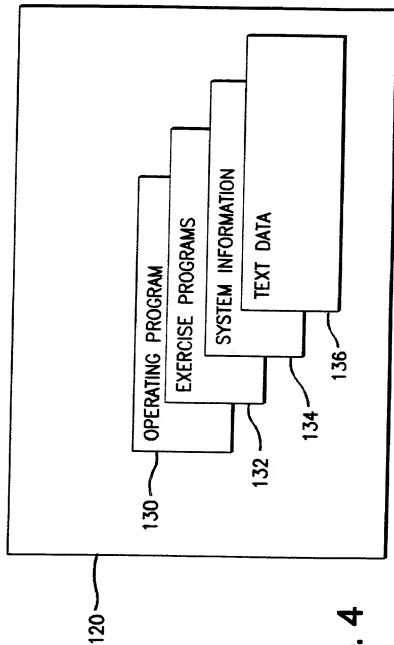
FIG. 4
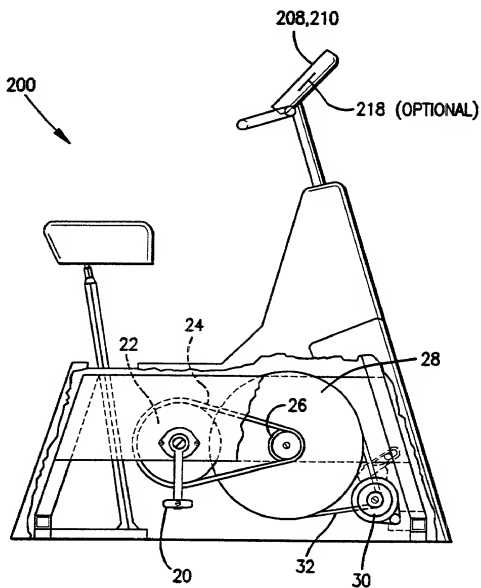
FIG. 5
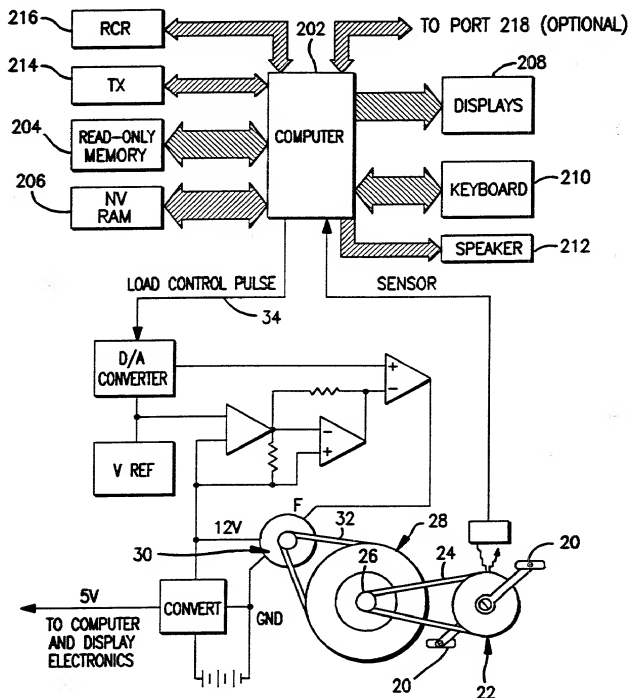
FIG. 6
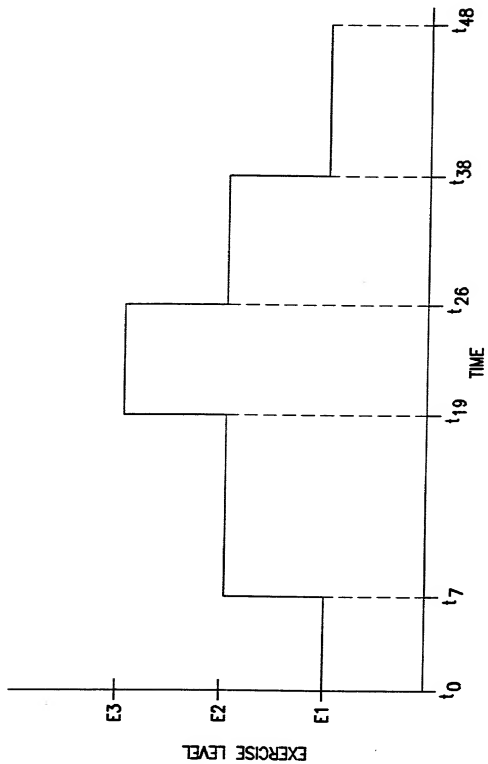
FIG. 7

1	PROGRAM	NAME AND DESCR.
2	PROGRAM	NAME AND DESCR.
3	PROGRAM	NAME AND DESCR.
⋮	⋮	⋮
n	PROGRAM	NAME AND DESCR.

FIG. 8

FIG. 9

SOLE DECLARATION FOR PATENT APPLICATION

COPY

As the below named inventor, I hereby declare that:

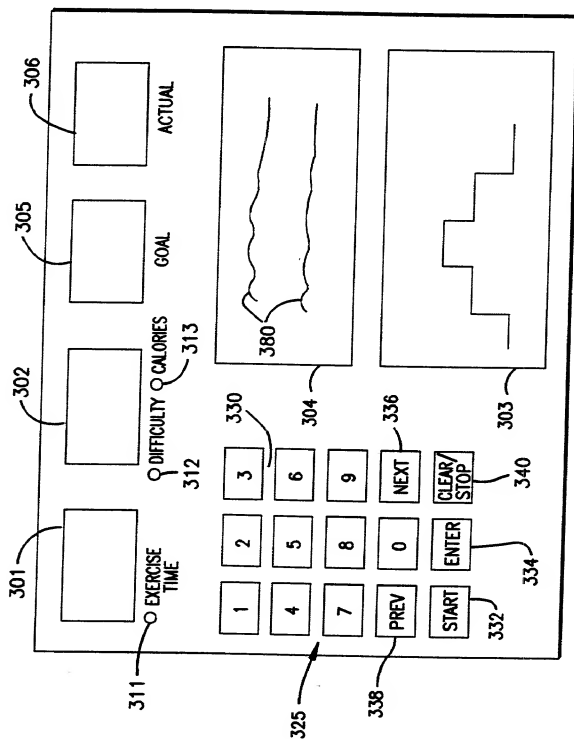My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled   EXERCISE APPARATUS

the specification of which

■   is attached hereto.

☐   was filed on _____ as Application Serial Number _____ and was amended on _____
(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Prior Foreign Application(s)

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Country	Application Number	Date of Filing (day, month, year)	Date of Issue (day, month, year)	Priority Claimed Under 35 U.S.C. §119

Prior United States Application(s)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial Number	Date of Filing (Day, Month, Year)	Status — Patented, Pending, Abandoned

All correspondence should be addressed to Michael J. Shea, 1726 Creek Crossing Road, Vienna, Virginia 22182.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature _Michael J Shea_   Date _6/22/95_

Full Name of
First Inventor_____SHEA_____Michael_____J._____

             Family Name   First Given Name   Second Given Name

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